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ΛcDM bounce cosmology without ΛcDM: The case of modified gravity

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Abstract

© 2015 American Physical Society. We provide an F(R) gravity description of a ΛCDM bouncing model, without the need for matter fluids or for a cosmological constant. As we explicitly demonstrate, the two cosmological eras that constitute the ΛCDM bouncing model can be generated by F(R) gravity, which can lead to accelerating cosmologies. The resulting F(R) gravity has the Einstein frame inflationary properties that have concordance with the latest Planck observational data. Both the F(R) gravity stability properties are thoroughly investigated, and also, the gravitational particle production, a feature necessary for the viability of the ΛCDM bounce scenario, is also addressed. As we will show, the ΛCDM bounce model can be successfully described by pure F(R) gravity, with appealing phenomenological attributes, which we extensively discuss.

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